

What is claimed is: -

1. A method for preventing pole tip protrusion and write induced instabilities in a disk drive, comprising:

sensing a temperature of said disk drive;

5 setting at least one of a write current and a write current boost equal to a value dependent on said sensed temperature, wherein a distance of a transducer head from a disk is maintained within a desired range, and wherein data errors due to write induced instabilities are not encountered.

2. The method of Claim 1, wherein said step of setting at least one of a write current and a write current boost comprises:

applying said sensed temperature to an algorithm to determine a current level adjustment for said at least one of said write current and said write current boost.

3. The method of Claim 1, wherein said step of setting at least one of a write current and a write current boost, comprises:

applying said sensed temperature to a table, wherein a value corresponding to at least one of said write current and said write current boost at said sensed temperature is
5 obtained from said table.

10029478-10001

4. The method of Claim 1, further comprising:

determining a nominal current amount for said write current, wherein said step of determining comprises:

writing a test sequence of data using a first write current level;

5 reading servo sector position data;

in response to an error reading servo sector position data, decreasing said write current level; and

setting said nominal current amount for said write current equal to a second magnitude, wherein said second magnitude is less than said first magnitude.

5. The method of Claim 1, further comprising:

determining a nominal current amount for said write current, wherein said step of determining comprises:

writing a test sequence of data using a first write current level;

5 receiving a signal from servo sector position bursts;

in response to a change in position indicated by said signal of at least a first magnitude, decreasing said write current level; and

setting said nominal current amount for said write current equal to a second magnitude, wherein said second magnitude is less than said first magnitude.

6. The method of Claim 1, wherein said at least one of a write current and write current boost is increased at a first temperature below a nominal temperature.

7. The method of Claim 1, wherein said at least one of a write current and write current boost is decreased at a second temperature above a nominal temperature.

8. The method of Claim 1, wherein said at least one of a write current and a write current boost is less than an amount of current that would cause a transducer head pole to protrude an amount such that said transducer head contacts said disk, and is greater than an amount of current that would be insufficient to magnetize a desired volume of said disk.

9. The method of Claim 1, further comprising:
testing said disk drive to obtain said at least one of a write current and a write current boost value dependent on said sensed temperature, wherein said testing comprises:

sensing a temperature of said disk drive;
providing a first write current to said transducer head pole, wherein data is written to said disk;

determining at least one of a position error signal associated with said transducer head and a mean square error signal associated with said data;

in response to at least one of a position error signal and a mean square error signal within a first acceptable amount, increasing said write current;

in response to at least one of a position error signal and a mean square error signal outside of a second acceptable amount, decreasing said write current.

10. The method of Claim 1, further comprising:

15 testing said disk drive to obtain said at least one of a write current and a write current boost value dependent on said sensed temperature, wherein said testing further comprises:

sensing a temperature of said drive;

providing a first write current and write current boost to said transducer

20 head pole, wherein data is written to said disk;

determining at least one of a position error signal associated with said transducer head and a mean square error signal associated with said data;

25 in response to at least one of a position error signal and a mean square error signal within a first acceptable amount, increasing at least one of said write current and said write current boost;

in response to at least one of a position error signal and a mean square error signal within a first acceptable amount, decreasing at least one of said write current and said write current boost.

30 11. The method of Claim 1, wherein contact between said disk and said pole due to pole tip protrusion is avoided.

12. A method for preventing contact between a transducer head pole and a magnetic storage disk in a disk drive, comprising:

determining at least one of a maximum write current and a maximum write current boost for a transducer head at a first temperature of said disk drive, wherein said transducer head pole is not caused to protrude and write induced instabilities are not caused during write operations performed at said first temperature of said disk drive;

setting at least one of a nominal write current and a nominal write current boost equal to said determined at least one of a maximum write current and a maximum write current boost, wherein said at least one of a nominal write current and a nominal write current boost is supplied to a write head during write operations performed at said first temperature of said disk drive.

13. The method of Claim 12, further comprising:

measuring a temperature of said disk drive;

compensating at least one of said nominal write current and said nominal write current boost for temperature to obtain at least one of a temperature compensated write current and a temperature compensated write current boost;

supplying at least one of said temperature compensated write current and said temperature compensated write current boost to said write head during a write operation.

14. The method of Claim 13, wherein said step of compensating comprises:
- applying said measured temperature to an algorithm, wherein at least one of a write current and a write current boost temperature compensation value is obtained;
- applying said at least one of a write current and a write current boost temperature compensation value to at least one of said nominal write current and said nominal write current boost, wherein said at least one of said temperature compensated write current and said temperature compensated write current boost is obtained.
- 5

15. A method for providing a temperature compensated write signal in a disk drive, comprising:

measuring a temperature of said disk drive, wherein said disk drive is at a first temperature;

5 writing a first sequence of data to a first track of a magnetic storage disk using a first transducer head, wherein a first write current amount and a first write current boost amount are supplied to said first transducer head;

10 writing data to second and third tracks adjacent to said first track, wherein said first write current amount and said first write current boost amount are supplied to said first transducer head;

reading said data from said first track, wherein a bit error rate for said data is determined;

15 in response to a bit error rate that is within a predetermined bit error rate, increasing at least one of said write current amount and said write current boost amount and repeating said steps of writing;

in response to a bit error rate that exceeds said predetermined bit error rate, decreasing at least one of said write current amount and said write current boost amount;

20 setting at least one of a first nominal write current amount and a first nominal write current boost amount equal to an amount that does not result in a bit error rate that exceeds said predetermined bit error rate;

writing a second sequence of data to a track of said magnetic storage disk;

in response to detecting at least one of an error reading servo sector position information and a position error signal indicating a change in position of said first transducer head of at least a first magnitude, decreasing at least one of said first nominal write current amount and said first nominal write current boost amount.

16. The method of Claim 15, further comprising:

measuring a temperature of said disk drive, wherein said disk drive is at a second temperature;

altering at least one of said first nominal write current amount and said first nominal write current boost amount to obtain at least one of a temperature compensated write current amount and write current boost amount;

providing said at least one of said temperature compensated write current amount and said temperature compensated write current boost amount to said transducer head.

17. The method of Claim 16, wherein said step of altering comprises:

applying said second temperature to an algorithm to obtain a correction amount;

and

applying said correction amount to at least one of said first nominal write current amount and said first nominal write current boost amount.

18. A hard disk drive device, comprising:

a magnetic storage disk;

a temperature transducer;

a transducer head, comprising:

5 a write head;

a read head;

a preamplifier, wherein an amount of current supplied to said write head during a write operation is adjusted for temperature and is less than an amount of current required to cause said write pole to protrude from said transducer head more than a nominal amount due to heating by said current and is less than an amount of current required to produce write induced instabilities in said read head.

19. The device of Claim 18, further comprising memory, wherein a table of at least one of write current and write current boost amounts for use at a plurality of different temperatures are stored, and wherein said amount of current supplied to said write head during a write operation is adjusted for temperature by supplying an amount of current indicated by said table for a measured temperature.

20. The device of Claim 18, further comprising memory, wherein at least one of a write current and a write current boost for said transducer head at a first temperature is stored, and wherein said amount of current supplied to said write head during a write operation is adjusted for temperature by applying a measured temperature to an algorithm
5 to obtain a temperature compensation value.